
5.0 Chapter 5 – Model Organization & Review of Inputs

QA/QC of a CORSIM model is important due to the simple fact that on a typical project, there is large amount of information that has been developed, synthesized, and entered into the model. A typical model could have as much as 3,000 lines of input; finding mistakes in a file of this size could be like finding a needle in the haystack.

The reality of any simulation modeling is that it is a human process, and we, as humans, will make mistakes. In order to ensure we have a quality process, systems need to be developed that allow the user to organize and automate input in order to reduce mistakes, and with that organization, allow someone else to review the inputs. This manual and the methods have been developed to organize every aspect of preparing a CORSIM model so that creating a quality model is easier to do and will allow a manager or peer to review the work in a timely fashion.

There are an infinite number of ways of using the input programs, text files, spreadsheets, and programs to prepare a CORSIM model. These methods and organizational techniques have been developed for Mn/DOT staff and consultants to follow so that the modeling requirements can be implemented more efficiently.

The rest of this chapter defines the organizational structure for electronic files and provides checklists for reviewing various aspects of the model. Implicit in the discussion is that the procedures for creating the model as described in Chapter 4 were followed. If the model was created without the systems in Chapter 4, the time it will take to perform the QA/QC checks will increase substantially. Based on recent experiences, it has been easier to completely redo a model that was not developed using Chapter 4 techniques than to try and review a model that is disorganized.

5.1 Organization of Model Data

There are a number of setup files and background pieces of information that go into preparing a simulation model. A very effective way to organize all of the information that went into a model is to prepare a model manual. The model manual is both a hard copy document and electronic file system. The file structure is a consistent system that, if uniformly used, ensures efficient review of the model inputs.

The model manual includes all the information that went into the model and includes the calibration and MOEs summary. Figure 34 is a screen capture of the model manual structure. During the model process and especially if there are multiple people working on the same model, files may reside temporarily on individual hard drives. This is acceptable while work is in progress, however, at the end of the day, the final products need to be collected into the uniform manual structure.

There should be a model manual prepared for existing conditions (calibration) and for each primary alternative considered. Subalternatives (modified primary alternatives) can be collected into the same manual by using subheadings under the main categories using the alternative description as a folder name. This will be explained further as each folder is described in detail.

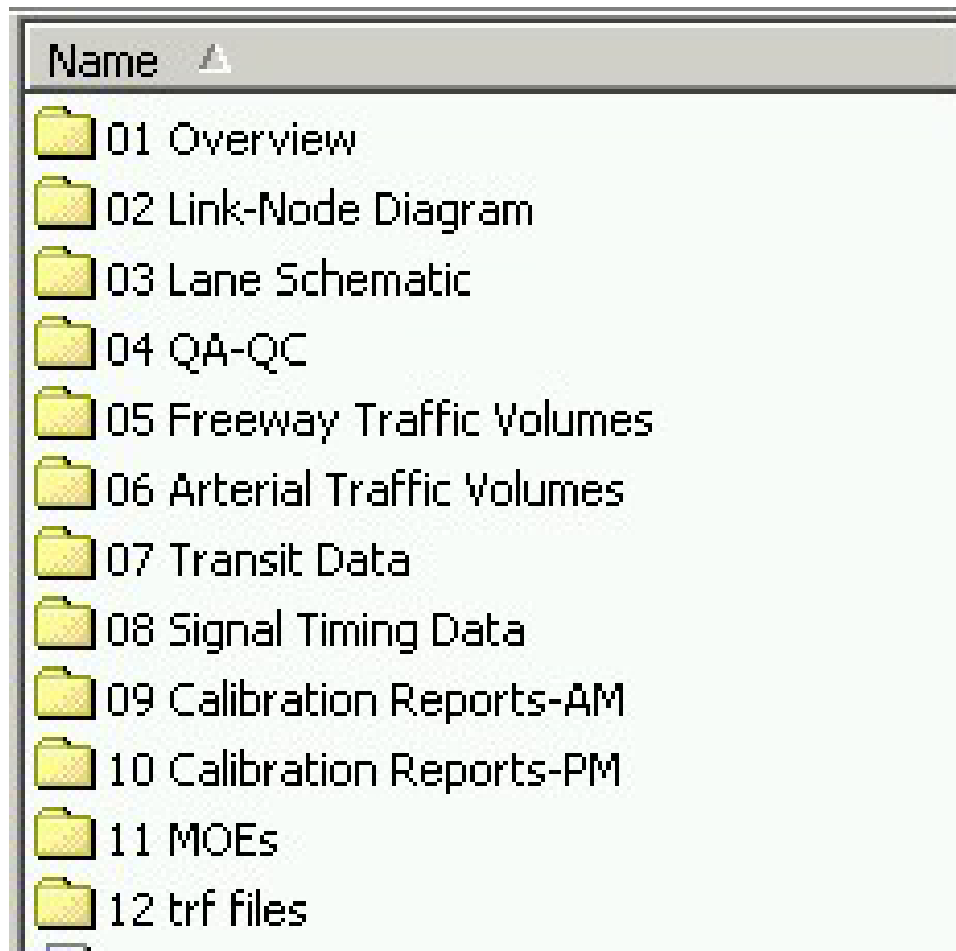


Figure 34 – Model Manual File Structure

What should go into the individual folders? The following descriptions will provide guidance as to what should go into each of the folders illustrated in Figure 34. The suggested file structure may be modified according to the needs of the project. The manual is not a report; it is a technical appendix with the explicit purpose of providing documentation of the CORSIM model to the reviewer. Given the type of information and format of the forms, preparing the manual in an 11x17 format is suggested.

01 Overview

Within this folder, any text files or charts/tables that describe the project and/or the alternatives contained within the manual should be provided.

02 Link Node Diagram

This folder should include both a paper and electronic copy of the link node diagram. The link node diagram should conform to the format as described in Chapter 4, which is a diagram on base mapping in real coordinates. For practical reasons, it is useful to prepare the link node diagram into 11x17 “plan sheets” at 300 scale.

	The link node diagram, depending on the project, may also be needed in one continuous roll plan as well.
03 Lane Schematic	The lane schematic folder includes the coding diagrams that are defined in Chapter 4.
04 QA/QC	In Chapter 4, the QA/QC tables were identified. All files pertaining to review of the physical inputs of the model belong here.
05 Freeway Volumes	This folder includes all raw count data and input volumes for the CORSIM model including O-D matrices and RT 25 and RT 50 inputs. Subfolders should be used to separate raw data from CORSIM inputs.
06 Arterial Volumes	This folder includes all turning movement count data and input volumes for the CORSIM model including RT 21, RT 22, and RT 50 inputs. Subfolders should be used to separate raw data from CORSIM inputs.
07 Transit Data	This folder is used only if buses are included in the model. Transit data would include route and stop information, Metro Transit ridership, and dwell time information. The source transit data needs to be converted into CORSIM inputs; these conversion tables should be saved in this folder.
08 Signal Timings	This folder includes signal design plans, timing sheets, field observation notes, and Synchro files.
09 Calibration Reports AM	This folder includes documentation of modifications made to the model to calibrate the AM peak conditions. The folder includes the calibration statistics and graphs that compare modeled volumes and speeds against observed speeds and volumes. This process is discussed in detail in Chapter 6. The calibration folders need not be used in the manuals for future alternatives; calibration only occurs for existing conditions.
10 Calibration Reports PM	This folder includes documentation of modifications made to the model to calibrate the PM peak conditions. The folder includes the calibration statistics and graphs that compare modeled volumes and speeds against observed speeds and volumes. This process is discussed in detail in Chapter 6. The calibration folders need not be used in the manuals for future alternatives; calibration only occurs for existing conditions.

11 MOEs

This folder includes all tables and figures that summarize the MOEs from every model set of runs.

12 TRFs

This folder includes all CORSIM input files *.trfs, *.tno, and *.out files. Documentation of random number seeds used should be included. *.tsd files should not be collected into the final model manual folder. These files can be over 1 gigabyte in size and will exceed the capacity of a data CD. By including the *.trf files, the reviewer will be able to copy the desired *.trf file to run on a hard drive and review the animation.

Other folders can be created as needed. The first 12 folders represent the essential information for CORSIM modeling that is needed for the review process.

5.2 Review of Physical Inputs

The process for reviewing the physical inputs of the model is to compare the information on the link node diagram and lane schematic against the input file. For freeway models, the QA/QC summary sheet combines the physical input information on a link-by-link basis that correlates to the diagrams. Again, if the model was prepared without using these techniques, the reviewer essentially has to recreate the model to ensure that the physical inputs have been coded properly.

The following sections provide lists and discussion of what is looked for in the review and what should be included. The methods for preparing the diagrams and summaries have been described in Chapter 4.

The review process should happen in stages. Before the calibration process can begin, a thorough review of the physical inputs and traffic volumes should be conducted. When mistakes are identified early, the calibration process is not as difficult.

5.2.1 Physical Input Review – Freeways

Review of the physical inputs of the freeway model includes the following items:

- Node Locations and Link Lengths. Nodes should be located according to the criteria in Chapter 4, lengths of links, especially around curves needs to be verified. The lengths will be verified by scaling distances from the link node diagram and comparing the value to the input file. Node locations should have been reviewed and agreed upon at an earlier stage; however, the independent reviewer will inspect the node locations and verify that the node criteria have been satisfied.
- Accel/Decell Lane Lengths
- Number of Lanes and Lane Alignment
- Lane Drops/Lane Adds
- Ramp Meter Locations

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- Ramp Meter Timings
 - Free Flow Speeds
 - Curvature
 - Grades

5.2.2 Physical Input Review – Arterials

Physical arterial reviews occur in the NETSIM submodel the items include.

- Link Distances, Stop Bar to Stop Bar
- Lane Utilization
- Storage Lane Lengths
- Free Flow Speeds
- Signal Timings

5.3 Review of Traffic Volume Inputs

Traffic volume inputs, especially for multiple time periods, are a challenge to review. In an input file with 3,000 lines of code, over 2,000 lines could be devoted specifically to traffic volume data. If the volume data was manually entered in the file (i.e., each value was manually entered in TRAFED or TextEdit), it is almost impossible to check. If spreadsheet tools were used to enter the input information, the review is possible and can be done efficiently. The following questions will be considered by the reviewer.

5.3.1 Traffic Volume Inputs Freeway

Does the O-D matrix for each time period balance?

Do the overall freeway volumes balance?

How was the input information created? Is the input linked to a balanced database or was it manually entered?

5.3.2 Traffic Volume Inputs Arterials

Does the turning movement data balance for each time period?

Does the conditional turn movement coding balance?